Updates on PHG4KalmanPatRec

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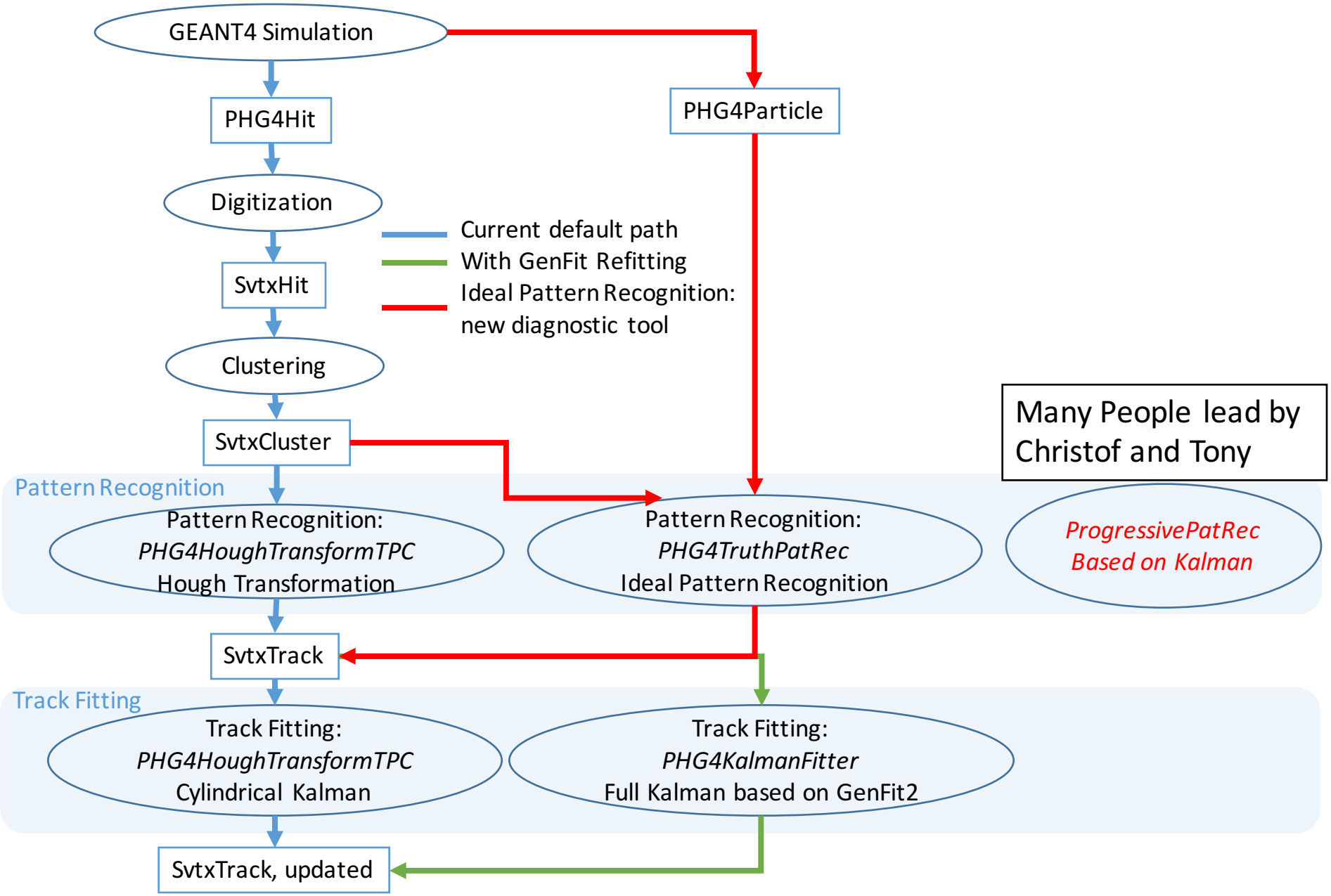
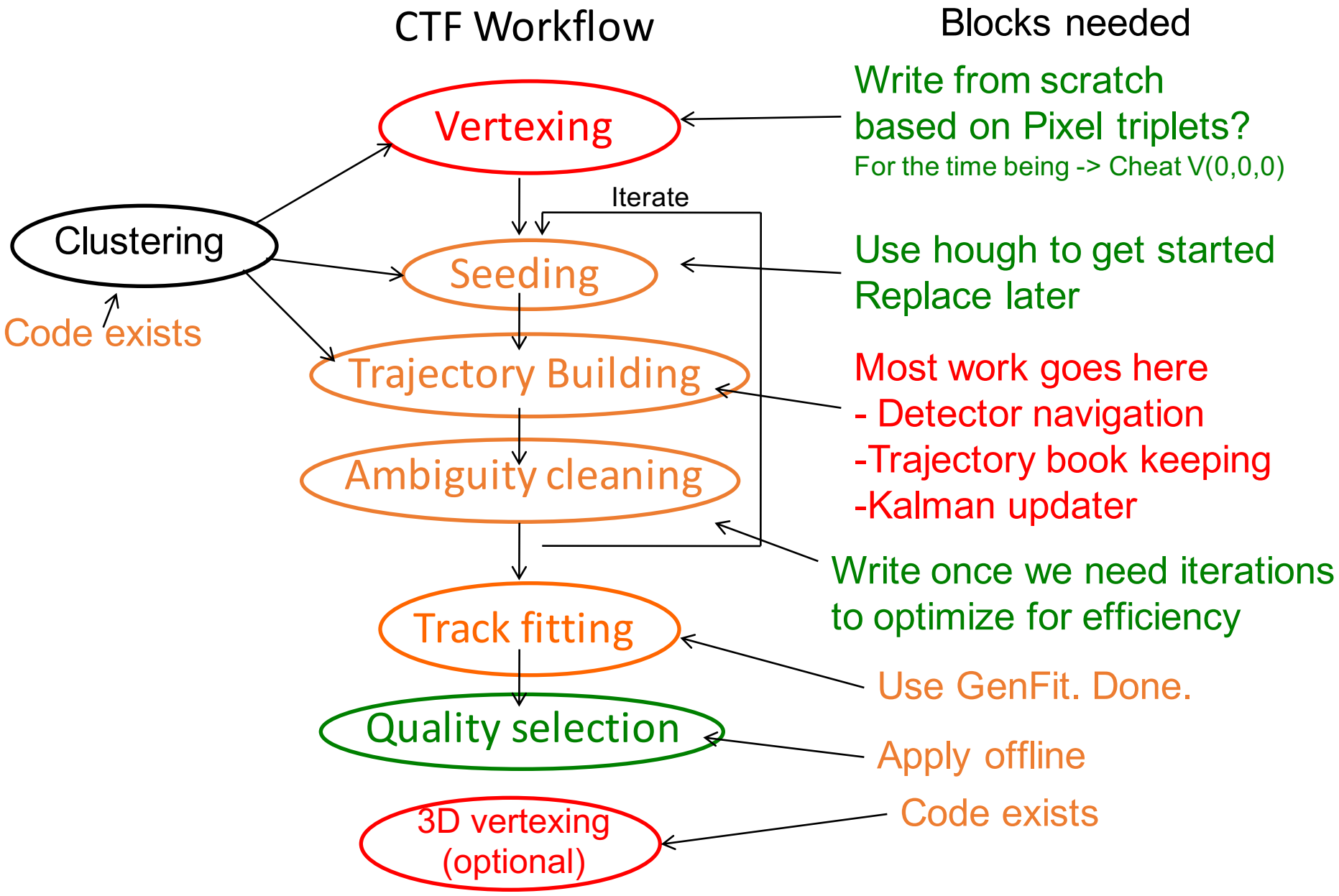
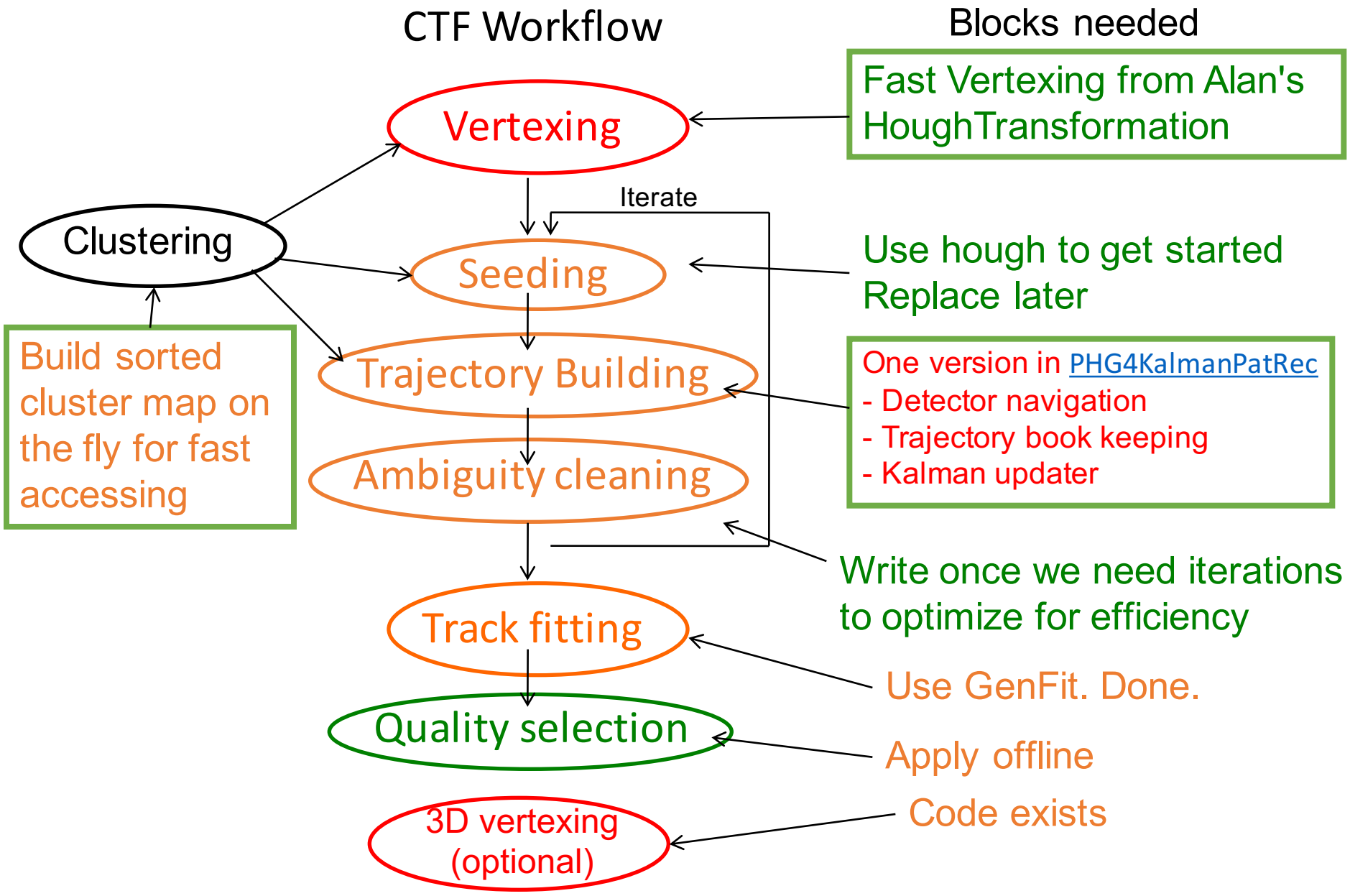
sPHENIX tracking



Christof's proposal



Christof's proposal



Vertexing and cluster map

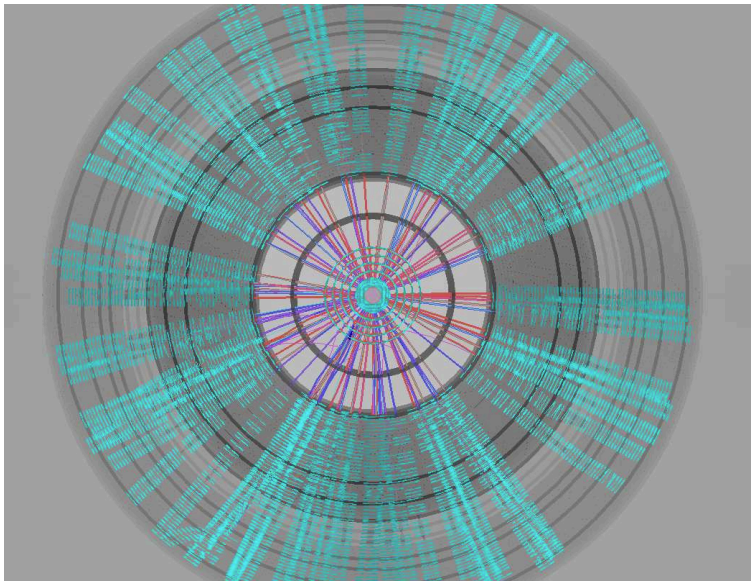
Fast vertexing inherited from Alan's code.
Vertexing with a maximum of ~20 tracks.

Build sorted cluster map: uint $\Longrightarrow$ unit
encode layer, iz, irphi into the 32 bit uint key

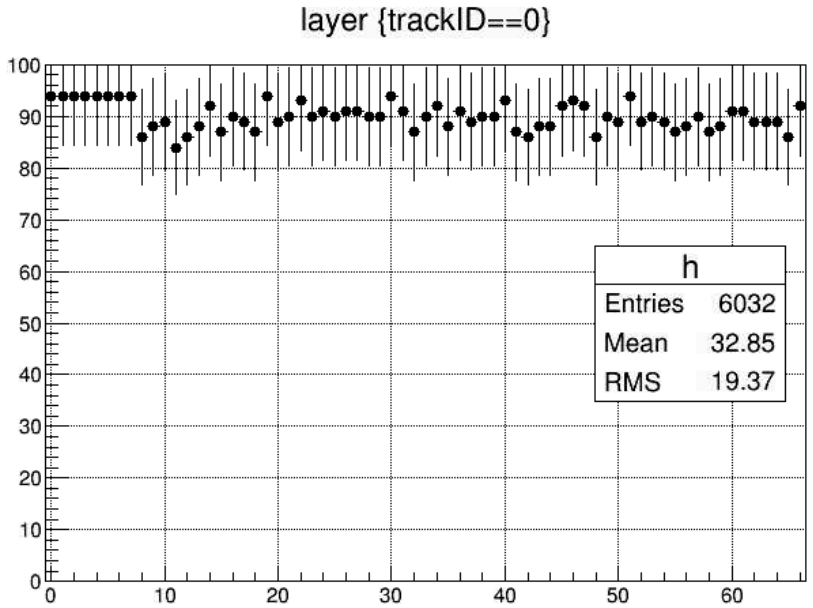
Updates on PHG4KalmanPatRec

- Now working with high multiplicity events
  - Tested with up to 1000 pions
- Good cluster association efficiency with some tuning
  - Seeding layer
  - Search window size
- Pattern recognition time:
  - ~130s/MB event (360 pions, 0-30GeV)
  - ~990s/1000 pions

Event display for 100 pions

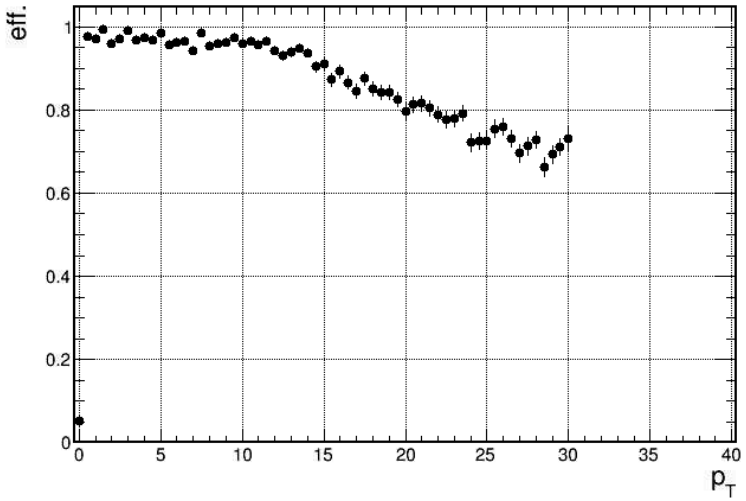


Seeding layer: silicon + 1 TPC
Search Window: 3σ

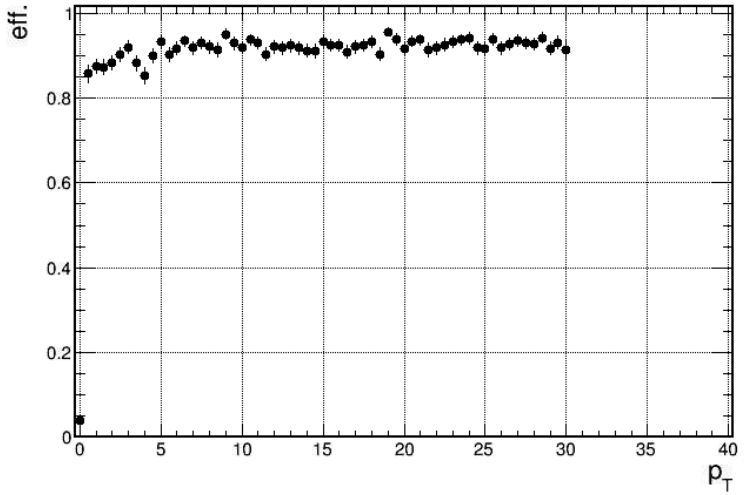


Seeding

Seeding = 7/7
- Silicon
- Require at least 7 hits



Seeding = 8/8
- Silicon + First TPC layer
- Require at least 8 hits



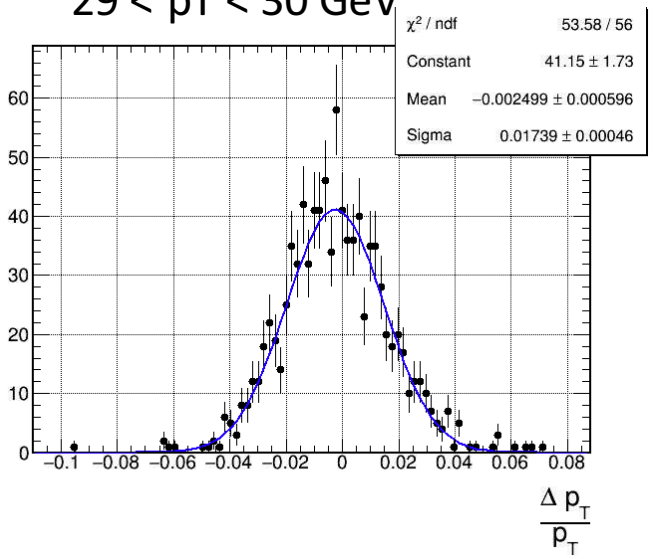
Initial test results with single pions:

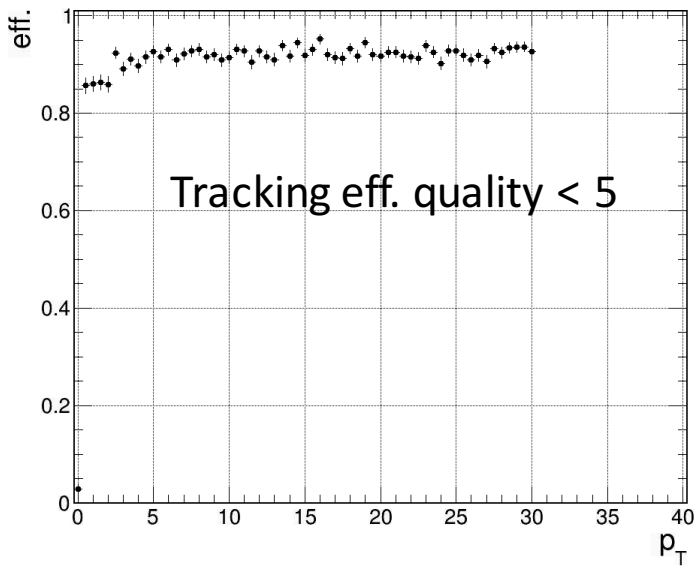
Input: single pions
- from V(0,0,0)
- 0 - 30GeV
- $-\pi < \phi < \pi$
- $-0.5 < \eta < 0.5$

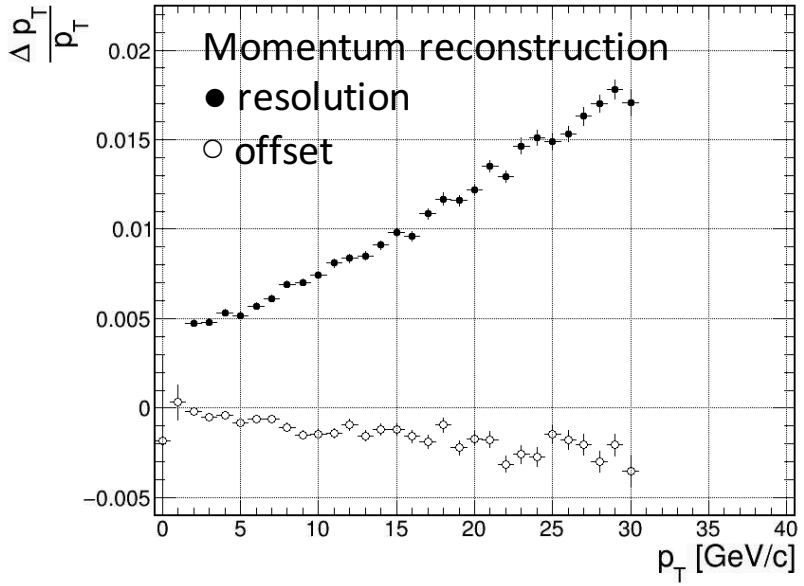
Seeding: Silicon + 1 TPC

Search Window 3σ

Momentum reconstruction
29 < pT < 30 GeV







Improve the speed

- Profiling using Callgrind:
  - https://www.phenix.bnl.gov/WWW/p/draft/yuhw/sPHENIX/BJetTagging/condor/macros_dev/callgrind/KalmanPatRec_10pion.png

- Most time spent on the Runge-Kutta propagation.
  - Using TGeo utilities navigate tracks

- Should substitute Runge-Kutta propagator with Helix/straight line propagator after track entered TPC volume

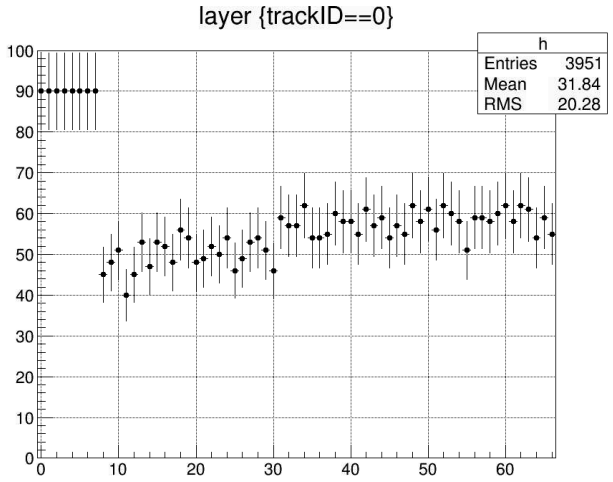
Backups

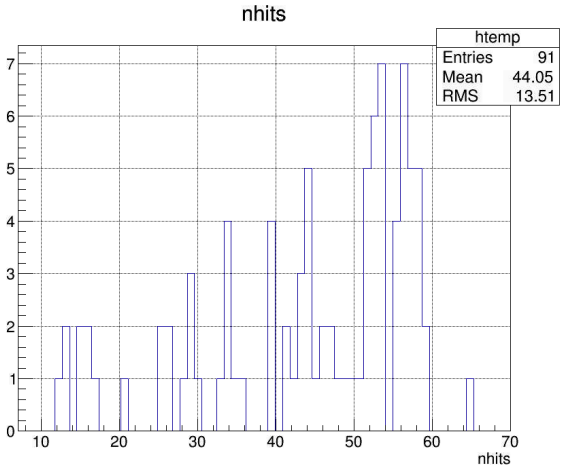
5GeV pions, after geometry r fixing

Seeding = 8
layer distribution

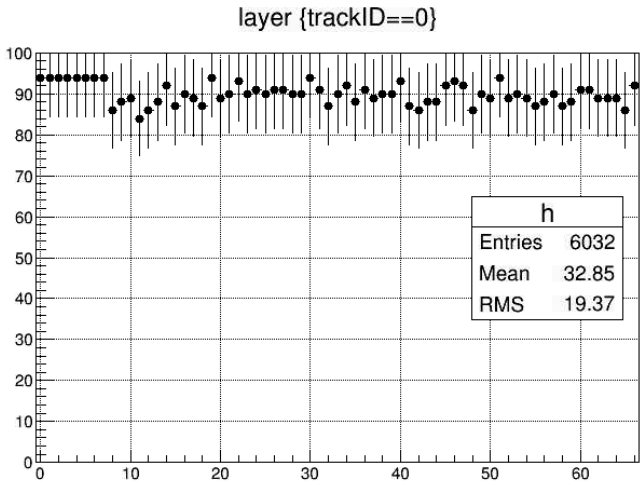
Seeding = 8
nhits

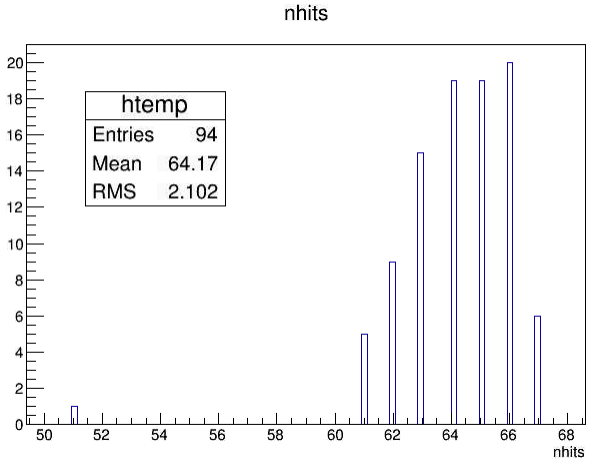
window = 2σ



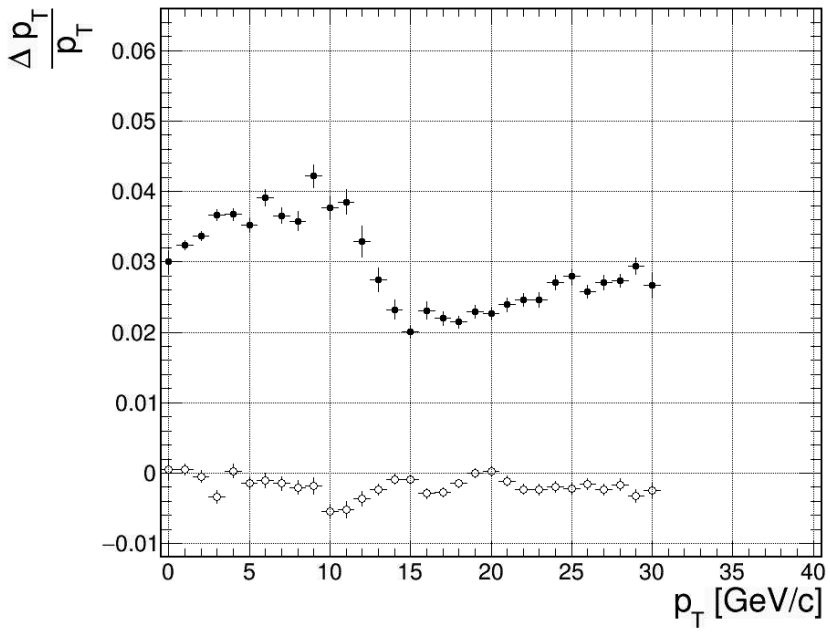


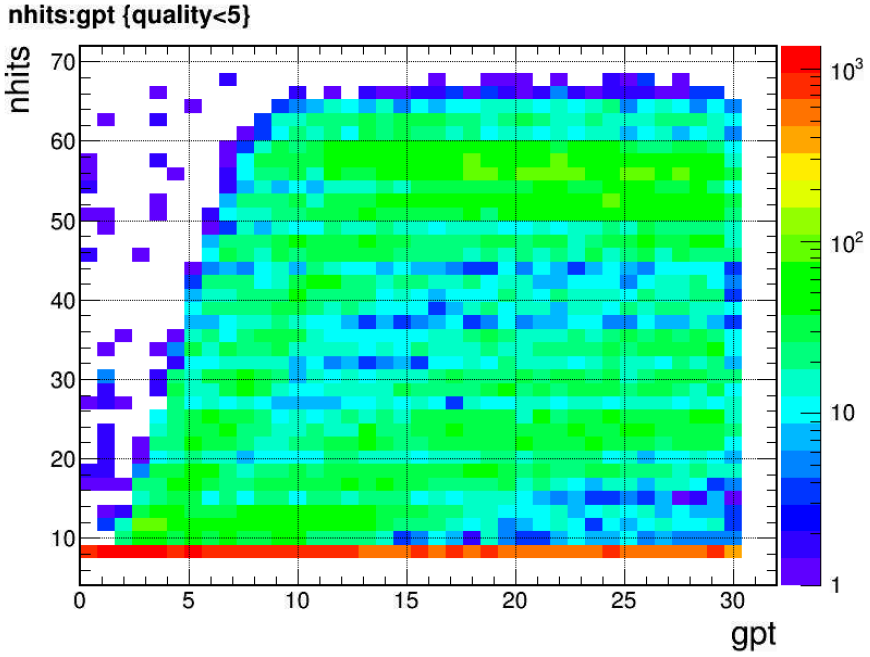
window = 3σ



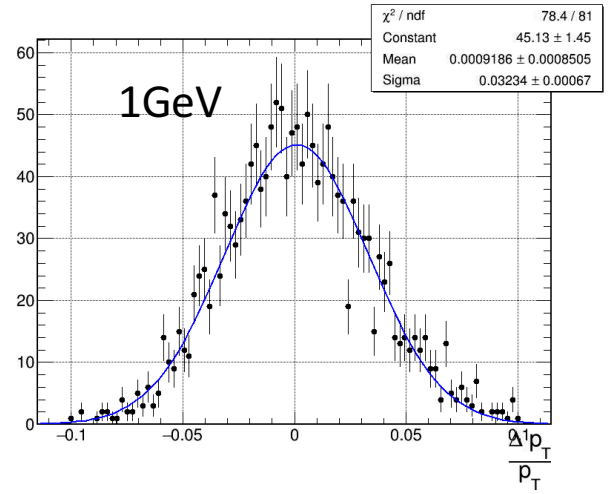


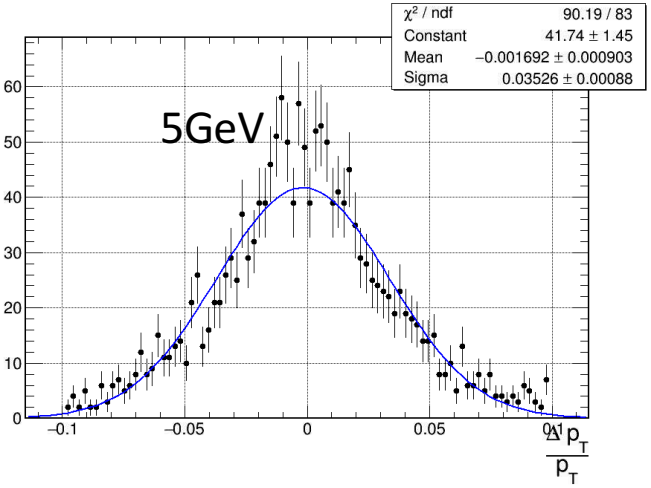
seeding with 8 layers, search window: 1σ

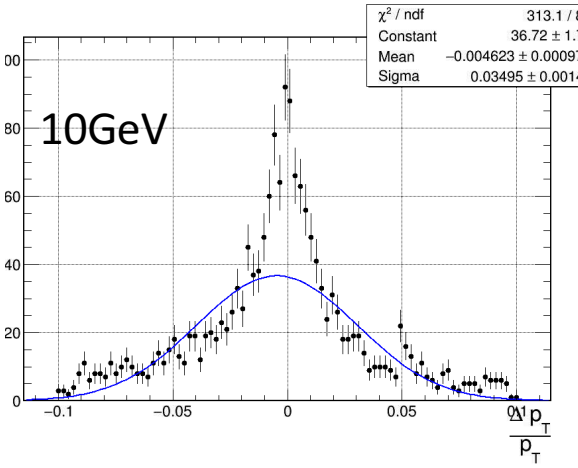


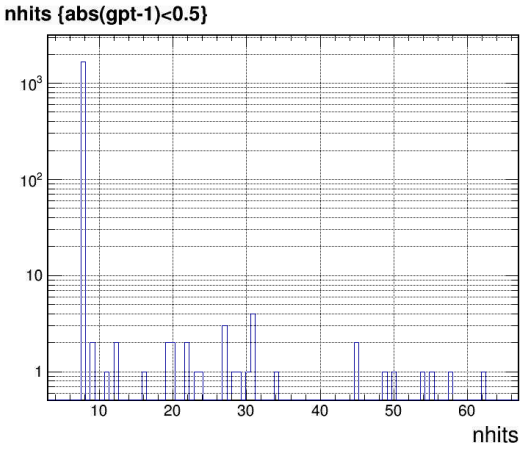


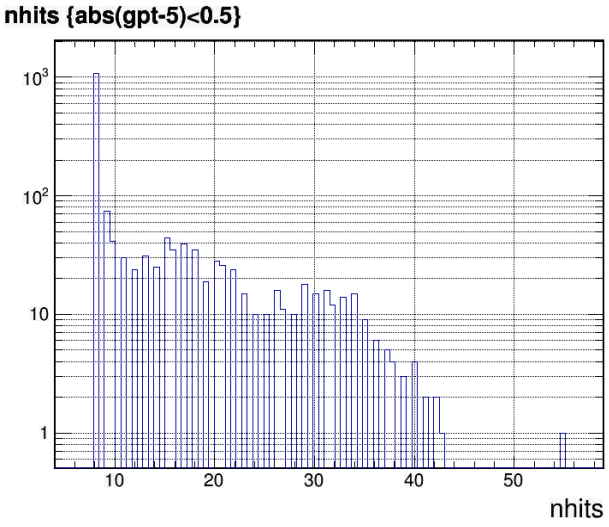
seeding with 7 layers, search window: 1σ









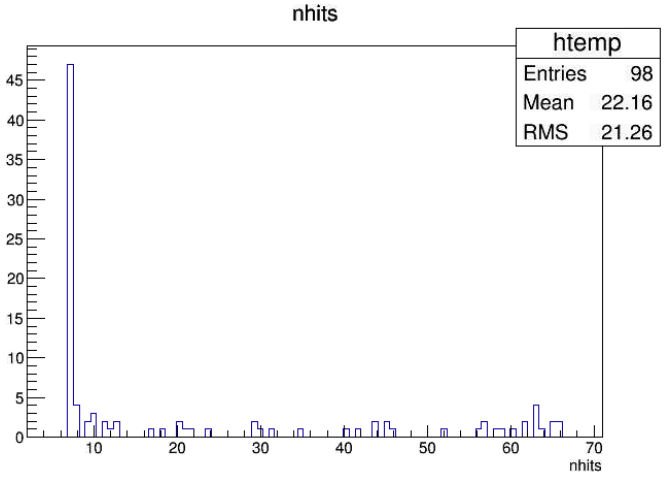


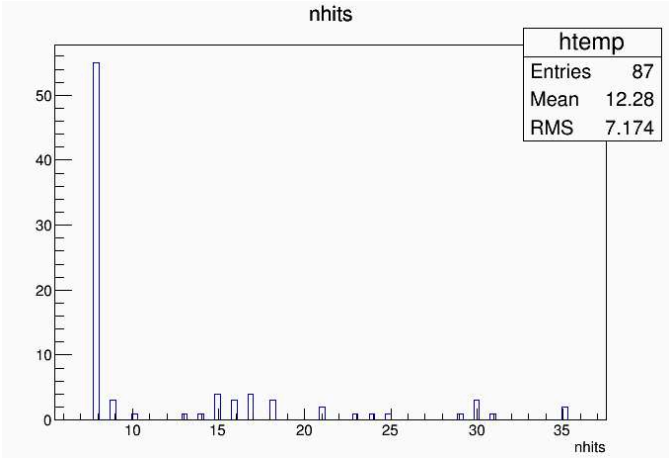
5GeV pions

Seeding = 7

Seeding = 8

window = 1





window = 2